

Theme: The metaverse

Interactivity and immersive experiences

The metaverse and Web 3.0 are two concepts that are still being defined, but they are expected to have an impact on individuals and companies in the years ahead. The metaverse is a network of three-dimensional (3D) virtual worlds in which individuals interact. Web 3.0, a broader concept, refers to the next generation of the internet. Over the past year, companies have launched strategies for operating in a 3D virtual world, where essentially anything in the physical world can have a digital twin.

In this theme article, we discuss how the development of hardware and software for virtual reality (VR) and augmented reality (AR) provides support for the development of the metaverse. We also discuss how concepts such as blockchains and non-fungible tokens (NFTs) can contribute to more decentralised structures, touching on areas that were previous *Investment Outlook* themes – such as 5G, the Internet of Things (IoT) and the video game industry.

The development of Web 3.0 includes technologies such as blockchain to register changes in ownership, facilitating transactions in digital goods between parties. This is expected to lead to a decentralisation of the internet, with sellers and buyers able to conclude agreements involving monetary transactions without using a third party, such as a bank.

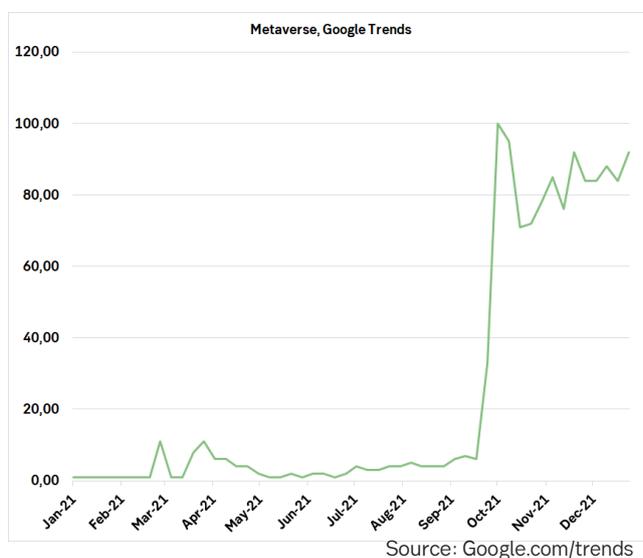
This development will also force companies to change their business strategies in order to be relevant online, which will affect communication between employees and the way they work in companies and other organisations. Just as the mobile internet and apps have affected how we interact today, the next step may significantly change the way we structure our work and leisure.

One industry at the forefront in developing the 3D virtual world is video gaming, a sector in which many Swedish companies have a strong position and may benefit from a digital future in which the physical world is integrated with the 3D virtual world – the metaverse.

The metaverse – hype or major force for the future?

The metaverse concept was introduced by science fiction writer Neal Stephenson, who coined the term in his 1992 novel *Snow Crash*. In the book, the main character uses a successor to the internet, which is a virtual world populated by avatars controlled by users – a virtual world beyond our universe.

Google searches for “metaverse” have risen sharply



The above chart shows how interest in the search term “metaverse” on Google has changed since the start of 2021 according to Google Trends, with an index value of 100 being the peak of search interest.

When Mark Zuckerberg announced last October that his company, Facebook, would change its name to Meta, the number of Google searches for “metaverse” skyrocketed. We also saw some uptick earlier in 2021, when online video game giant Roblox gained a stock market listing. This company provides a platform of online and console-based computer games in a virtual world where users, mostly children, create their own games, communicate with each other and can make purchases for their avatar.

One frequent explanation of why the expansion of three-dimensional virtual platforms will have an impact on our leisure and work is that they create a more immersive experience for users. Technological advances and the capability of different platforms to communicate with one another will determine whether an internet with a 3D virtual world will be created, one that increasingly interacts with the real world. There will probably be a number of platforms that offer 3D virtual experiences.

Digital twins

Creating a 3D world online that is integrated with physical reality requires sensors that measure analogue reality. With the help of VR and AR cameras, data can be translated via wireless and fibre networks, software and cloud services into 3D images and experiences.

Individuals can create a digital twin, their avatar, who interacts with others in 3D worlds. This digital experience can supplement or enhance the physical world.

These advances will also affect the way companies and other organisations work. Three-dimensional images can facilitate meetings, planning, collaboration and development through shared networks. As a result, companies can distribute, develop, simulate and test image-based information in real time wherever people are in the world. Work can also be carried out in parallel and not sequentially, which can increase productivity. Two examples of applications are simulating properties and cities before they are completed and developing new aircraft and other complex systems without the need for drawings. Such images can also be used in military operations, for training in a 3D world that corresponds to the mission location.

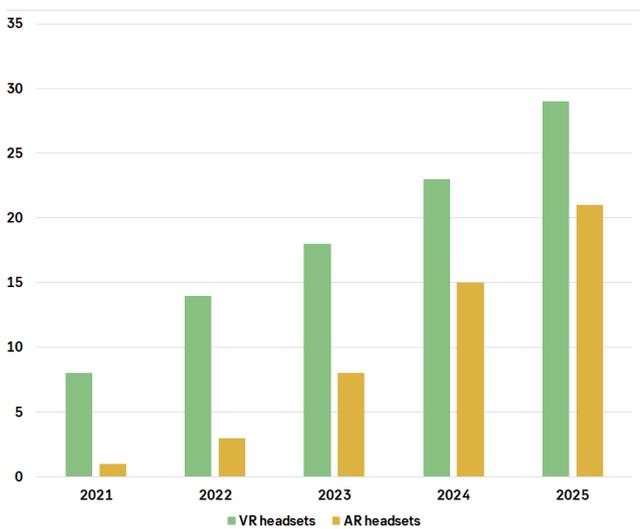
The Swedish telecom giant Ericsson has a broad portfolio of patents in the field known as the Internet of Things or IoT. Its two latest acquisitions, US-based companies Cradlepoint and Vonage, are part of its strategy to grow in the B2B market in order to support operators with services and develop integrated solutions in networks and communication. The company has not yet included the metaverse in its official strategy, but it is quite clear that Ericsson is working with 5G digital twin technology and AR to connect the physical to the digital world.

Virtual and augmented reality

The use of VR headsets and experience-enhancing AR headsets is expected to increase sharply as the metaverse develops. Oculus, a subsidiary of Meta (formerly Facebook), is the clear market leader in portable VR and AR devices.

According to International Data Corporation, 8 million VR and 1 million AR headsets were expected to be delivered in 2021. These numbers are expected to multiply in the years ahead. Apple, Samsung, Microsoft and Google also have ambitions to expand in this field.

Rapid growth in VR and AR headsets



Source: eMarketer/International Data Corporation

The above chart shows the number of VR and AR headsets expected to be sold globally in the period 2021-25. A nearly threefold increase in VR headsets and an increase of about 2,000 per cent in AR headsets are expected in 2025 compared to 2021.

In mid-2021, the CEO of Unity Software and former head of Electronic Arts, John Riccitiello, predicted that AR and VR headsets will be as common in 2030 as game consoles are today. Unity develops software for hardware platforms and should have good insight into future launch plans.

Investments and endeavours related to the metaverse

When it released its third quarter 2021 earnings report, Meta announced that it would start publishing figures for its AR/VR operations under a separate unit, Facebook Reality Lab. This is because the company intends to invest significant resources in AR and VR products and services, which it believes is an important step for the next generation of online social experiences. This includes investments in hardware, software and content. These operations are expected to have a negative effect on the company's total earnings of USD 10 billion annually, which can be compared to Meta's quarterly operating profit of USD 10-12 billion. Obviously investments in the metaverse are important to the company. Meta/Facebook has also lured more than 100 engineers from AR competitor Microsoft in its drive to be at the cutting edge of this trend.

According to the investment bank Goldman Sachs, global investments in these technologies and systems may total between USD 100 billion and 1.3 trillion annually in the years ahead – including development, testing and technology

integration as well as hardware and software for AR, VR and blockchains. As the wide range of this forecast suggests, these are rough estimates that are subject to great uncertainty, since not all companies have announced their strategies.

Web 3.0

The internet has evolved from initially being used mostly on desktop computers at home or in workplaces to increasingly being used today on people's mobile phones or other mobile devices anywhere in the world. This trend has also entailed a shift from local software and data processing to subscriptions for cloud services that provide continuously updated software and storage potential. Mobile internet and the development of apps have delivered large economies of scale to leading central platforms. Companies have grown with limited distribution costs. As the number of customer transactions rises with the expansion of new products or services, economies of scale and limited cost increases will benefit companies such as Facebook/Meta, Apple and Google.

Web 3.0 is the next step in the development of the internet – a 3D virtual world that includes the metaverse and features transactions carried out through blockchains. With blockchain technology, there is no need for a third party to verify a transaction. This can create a more decentralised internet with new platforms that anyone can participate in. It provides a structure featuring increased direct contact between creators, brands and end customers, without the need for intermediaries.

Blockchains and NFTs

The term blockchain refers to a distributed ledger or decentralised database that is stored in multiple copies, a so-called peer-to-peer network. Each event is stored by adding a block of data to the ledger. The technology can be used to register changes in ownership and creates the potential to register, certify and prove who owns an individual asset. Payment can be made using various cryptocurrencies, but also existing currencies.

Blockchains reduce the need for central players such as government authorities, financial institutions and major commercial platforms to ensure secure, reliable trading in goods. That is one reason why the development of the internet is expected to be increasingly decentralised.

Digital assets are made unique through blockchain technology, which creates opportunities for trading and ownership rights. Although a digital good can be copied any number of times, the chain of transactions proves who owns the original digital asset. Such an asset is called a non-fungible token (NFT) and is a digital certificate for a good that cannot be exchanged. Revenue from digital products for big brand companies today represents a very small share of the market. However, interest is starting to grow, and strong brands are launching new collections and products – both physical and digital – simultaneously. Network effects can generate broader interest in these collections as well as a stronger brand. Creators of art works and other attractive assets can also expand their market.

Strong brands can benefit from the advances on the internet. Even today, many companies – such as sportswear manufacturers Puma and Nike – generate an ever larger proportion of sales through their own websites. With fewer intermediaries, revenue and gross margin both increase even if volumes do not grow. Nike has acquired companies that build virtual products, not only to increase revenue but also enhance their brand among consumers who participate in the virtual world. Fashion giant Ralph Lauren is partnering with Roblox, an online video game and social media platform, to enhance its brand and create new revenue streams. Just as in the physical world, owners of digital goods may believe they derive a benefit from the asset, but interest can also be based on expectations that the asset may rise in value and generate a financial return.

The gaming industry has a big lead in the metaverse

Gaming has created groups of users whose participation also creates purpose and meaning apart from their actual gaming. The virtual world has been around for a number of years in gaming, which in recent years has seen an increase in VR use as the hardware has improved. AR has also become more popular, with Pokémon GO – released by US-based Niantic – opening the gaming world's eyes to the combination of physical and digital reality. Two companies at the forefront of this field are Roblox and Epic Games, the developer of Fortnite. They have taken giant steps with their virtual worlds, which attract millions of daily users. Computer game platforms can also provide other 3D experiences besides games, for example music concerts.

There is a continued high level of merger and acquisition activity in the gaming sector, with two major acquisitions recently announced. Take-Two Interactive has offered to pay Zynga shareholders USD 12.7 billion for the company, while Microsoft has presented an offer for Activision Blizzard valued at USD 69 billion. For Take-Two, one reason for buying Zynga is to strengthen its position in mobile gaming, the fastest growing segment in the interactive entertainment industry. Microsoft will also strengthen its position in the mobile gaming market through its acquisition of Activision Blizzard (if it goes through). Microsoft also states that the acquisition is a good fit with its strategy of integrating cloud services and content and will bring together people with similar interests. This will create a network effect by broadening these games and should also increase the number of customers who use Microsoft's game services, in turn attracting more developers and more users. The company also indicates that this is one building block of its metaverse strategy. Microsoft says that gaming has created groups of users where participation in the group also has a purpose other than gaming. The metaverse is another step in connecting these groups. Microsoft estimates that the number of users of console, computer and mobile games – and increasingly games via cloud services – will grow from 3 billion today to 4.5 billion by 2030.

Among Swedish game developers, a somewhat smaller company called Beyond Frames stands out as a potential

acquisition candidate for metaverse creators. The company develops games for VR and AR and had its media breakthrough when Mark Zuckerberg used its game Down the Rabbit Hole to make a demo for Meta's VR headset Oculus Quest 2. This caused Beyond Frames' share price to surge.

At the larger Swedish listed companies Embracer, Paradox Interactive and Stillfront, plans and investments for the metaverse are less clear, as are their efforts to integrate titles and games. When Embracer released its latest quarterly report, a game from its Vertigo Games studio was mentioned as being a true metaverse title. This may be a hint that Embracer is keeping its eyes on this trend and trying to find studios and titles that can ride the metaverse wave. However, this was the only time the word was mentioned before a question about the metaverse was asked by the audience. CEO Lars Wingefors was also clear that the company is investing primarily in content and titles that populate the metaverse rather than in actually creating the platform.

We can only speculate about how Paradox Interactive and Stillfront will approach the metaverse, but they are also two video game publishers that currently have no titles or game developers focusing on VR or AR development. For Paradox, young people who use Roblox's platform or play Fortnite today do not belong to the company's target group, which most likely means the company has not yet focused on the metaverse phenomenon. Today Stillfront has a broad range of mobile games in different genres. If its target group crosses over to metaverse platforms, its game developers and future investments can probably be expected to shift to these platforms.

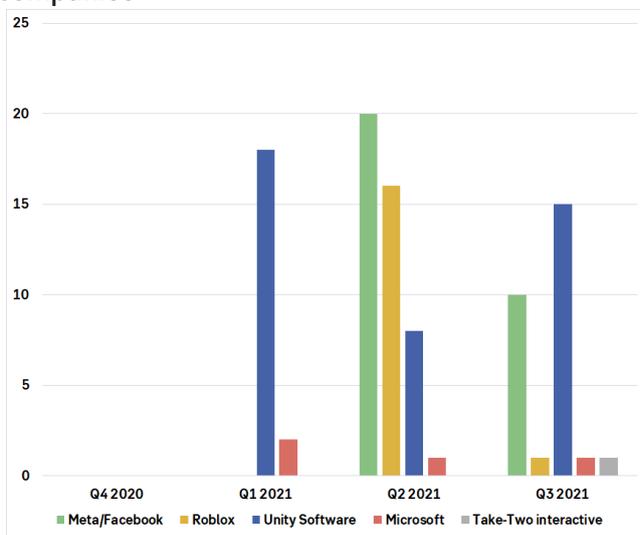
Summary

How we communicate and use the internet is continuously evolving. Technological advances and standardisation of communication, software and hardware will create changes. Online communication has shifted from text to images and videos. One expectation is that this will increasingly include 3D virtual experiences that supplement reality. Another factor impacting the internet is the development of such technologies as blockchain. This will create opportunities for individuals and companies, but will also require a change in company strategies. It remains to be seen whether the metaverse is a development that will take place on most platforms or whether it will create an entirely new infrastructure. The interoperability of various systems and platforms may determine how the metaverse develops. Whether the internet will become more decentralised, or whether major platform companies will continue to dominate it, is a question whose answer will become more apparent in the years ahead.

Video game companies are working at the forefront of virtual 3D experiences. They use their platform of members to offer game-related adventures. A consolidation through mergers is under way in the industry, with mid-sized companies acquiring smaller ones and market leaders aiming to further strengthen their position mostly in mobile gaming. Along with economies of scale, increased content, interactivity and the

creation of immersive experiences are buzzwords for these companies. To get some idea of which US companies have an exposure to the metaverse concept, we examined how many times the word was used in conjunction with the release of their quarterly earnings reports for the period Q4 2020 to Q3 2021. The company that was the earliest to use the word and mentioned it most often is San Francisco-based Unity Software. Roblox and Meta/Facebook also rank at the top of the list, which probably means that the metaverse is a large element of their strategy.

Metaverse: an increasingly popular word among companies



Source: Bloomberg

The above chart shows how many times the word “metaverse” was used by business leaders in their quarterly earnings report presentations for the period Q4 2020 to Q3 2021.

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This report was published on February 8, 2022.

Its contents are based on analysis and information available until February 7, 2022.

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